

86. (As Filed) The device of claim 66, wherein said second plurality of contact holes are formed by a wet etch process.

87. (As Filed) The device of claim 66, wherein said second plurality of contact holes are formed by a dry etch process.

88. (Amended Once Herein) The device of claim 66, wherein said second plurality of contact holes are **[formed]** filled by a CVD process.

IN THE DRAWINGS:

Examiner's rejection is noted and Applicant will submit revised formal drawings later in prosecution.

REMARKS

Claims 1-88 were pending in this application. Claims 1, 2 and 4 have been allowed. Claims 3, 7, 8, 9, 12, 15, 27, 39, 41, 47, 66, 82 and 88 have been amended, claims 29, 40, 44, 71 and 81 have been canceled and no claims have been added. Hence, claims 1-28, 30-39, 41-43, 45-70, 72-80 and 82-88 are now pending. Reconsideration of the subject application as amended is respectfully requested.

At the outset, Applicant appreciates Examiner's effort in progressing this prosecution by providing a detailed claim chart. Applicant further thanks the Examiner for the allowance of claims 1, 2 and 4, and the indicated allowability of claim 3.

FORMAL MATTERS

Claim 3 has been indicated by the Examiner as allowable if a typographical error is corrected. Applicant heeds Examiner's suggestion and amends claim 3 accordingly.

Next, Examiner requires re-submission to comply with 37 CFR 1.172(a) to formally establish ownership interest of the assignee in the original patent. Accordingly, such a submission is enclosed herewith.

## ARGUMENTS

### **112 Paragraph 1 Rejections**

Claims 5-88 have been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

First. Examiner states that “claim 5 limits the deposition to occur ‘by one single step’, the method of which is not explained anywhere in the specification.” *Office Action* 3/9/00 at pg. 10. Accordingly, Applicant directs Examiner’s attention to Applicant’s Figure 2B illustrating a single step fill of contact hole 20. This single step-fill is one of the “two-step deposit . . . made available by the tungsten thin layers.” *Applicant* at col. 3, lns. 20-21. The one single step of the two-step deposit can be formed by “selective tungsten thin films 9 by the CVD method.” *Applicant* at col. 3, ln. 38. At least by way of this description, one of ordinary skill in the art would be prepared to apply Applicant’s invention. Accordingly, Applicant respectfully requests withdrawal of Examiner’s rejection.

Second. Examiner rejects claims 44 and 71. Applicant notes to Examiner that claims 44 and 71 are dependent claims and in an effort to move prosecution forward, Applicant cancels claims 44 and 71 without prejudice or disclaimer.

Third. Examiner states that “claims 82 and 88, possibly by typographical error, are directed to a step of ‘forming holes by CVD,’ which is not supported by the specification.” *Office Action* 3/9/00 at pg. 10. Applicant amends claims 82 and 88 accordingly, and both claims are now allowable with respect to § 112.

Fourth. Examiner states that “claims 6-88 provide for a substrate other than silicon, but it is unclear from the specification what other types of selective deposition are possible with non-silicon substrates.” *Office Action* 3/9/00 at pg. 11. Applicant respectfully traverses the rejection.

At the outset, it should be recognized that Applicant’s invention applies to “highly integrated semiconductor device[s].” *Applicant* at col. 1, lns. 10-12. Further, as those skilled in the art have long known that semiconductor devices are manufactured using substrates other than silicon, it should be easily foreseen that one skilled in the art would know

to apply Applicant's invention to other substrates. Not only were substrates other than silicon known in the art, but interconnects were used in fabricating devices using such substrates. Again, it should not be argued that one skilled in the art would not have been taught to apply Applicant's invention to fabricating such devices. Accordingly, Applicant's invention applies to substrate types, including, but not limited to silicon.

As a matter of both law and reason, Applicant should be allowed to correct its claims to include substrates known in the art. Specifically, a patent specification "need not teach, *and preferably omits*, what is well known in the art." *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986) (*emphasis added*). Any other approach would turn a specification into a catalogue of existing technology. This absurd result would drastically reduce the readability of specifications and ultimately undermine the patent system. Accordingly, Applicant respectfully requests withdrawal of Examiner's rejection.

### **112 Paragraph 2 Rejections**

Claims 3, 5, 6, 8, 10, 12, 15, 17, 20, 23, 27, 41, 47-49, 55 and 66 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

First. Examiner states that "Applicant is required to define what is meant by 'conductive material' in the claims, keeping in mind the need for enablement of the specification in mind." *Office Action 3/9/00* at pg. 1. In response, Applicant recognizes that the scope of the claims must coincide with the scope of enabling disclosure set forth in Applicant's specification. However, in determining the enabling disclosure, Applicant's specification must be read in the light of knowledge in the art as of the application Applicant's filing date. Simply stated, Applicant need not repeat in the specification any information that is both known and readily available at the time of filing. Accordingly, disclosure of a single embodiment may provide broad enablement in cases involving predictable factors, such as mechanical or electrical elements. MPEP 2164.03 *citing*, *In re Vickers*, 141 F.2d 522, 526-27, 61 USPQ 122,127 and *In re Cook*, 439 F.2d 730, 734, 169 USPQ 298, 301.

Adhering to the standard provided above, Applicant respectfully asserts that the term “conductive material” is sufficiently defined and adequately enabled. In support of this assertion, Applicant notes to Examiner that at least one purpose of filling vias 30 and/or 10 is to provide electrical conduction. In fact, Examiner correctly notes that the invention involves “conductive vias.” *Office Action 3/9/00* at pg. 6. From this alone, one skilled in the art would recognize that conduction would be accomplished by way of a “conductive material” formed in the via by any suitable means known in the art. Further, the art provides teachings of selective deposition of not only Tungsten, but also many other conductive materials. For example, the art discloses “[c]ontact-hole filling through selective deposition of polysilicon.” *Wolf, Silicon Processing for the VLSI ERA, Vol. 2, at pg. 253*. From this, it should be recognized that one skilled in the art would understand providing a “conductive material” in the via by a suitable method including, but not necessarily limited to selective deposition.

Further, Applicant alerts those in the art that the specification provides only “preferred forms [described] with a degree of particularity . . . and that numerous changes in the details of the construction . . . may be resorted without departing from the spirit or scope of the invention.” *Applicant* at col. 4, lns. 10-17. With this alert and with the amount of knowledge in the art and the specification, one skilled in the art would have been able to readily anticipate the effect of using alternative conductive materials and alternative means of forming conductive material. *See e.g., MPEP 2164.03*.

Second. Examiner states that “in claim 5, it is unclear what depositing the metal ‘by one single step’ means.” *Office Action 3/9/00* at pg. 11. As used in claim 5, consistent with the prosecution history and illustration in the specification, one single step includes filling a contact hole without first forming a seed for the metal being formed in the hole.

Third. Examiner states that “in claim 47, it is unclear where in the process applicant intends to ‘include a junction layer.’” Accordingly, Applicant amends claim 47 to clarify where in the process a junction layer is included.

Fourth. Examiner rejected claims 3 and 8 because the wording “the [metal] layer . . . has substantially equal depth” is not clear. *Office Action 3/9/00* at pg. 12. Applicant heeds Examiner’s suggested change, and amends claims 3 and 8 to provide that the second plurality of contact holes are filled to a substantially equal depth.

### **Claim Rejections Based On Recapture**

Claims 6-88 have been rejected under 35 U.S.C. § 251 as being improper recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based.

First. Examiner rejects claims 29, 40, 56 and 81 for lack of a tapered limitation. Accordingly, Applicant amends the aforementioned claims to overcome Examiner's rejection. Specifically, independent claims 39 and 66 (claims 40 and 81 are dependent upon claims 39 and 66 respectively) have been amended to include a limitation of a tapered upper portion. Further, claims 27 and 41 (claims 29 and 56 are dependent upon claims 27 and 41 respectively) have been amended to include an upper portion width greater than a lower portion width.

Second. Examiner rejects claims 12, 17, 20, 23, 31, 32 and 41. Specifically, Examiner notes that the "of substantially equal depth" limitation is removed. Applicant respectfully points out that each of the rejected claims include a substantially equal limitation sufficient to overcome Examiner's rejection included in the prosecution history. Accordingly, no improper recapture exists. Thus, Applicant respectfully requests Examiner's withdrawal of the rejection.

Third. Examiner rejects claims 6-88 for broadening from silicon to substrate. Examiner states that "Applicant's only disclosed (and enabled) embodiment is for selective deposition of tungsten on silicon." *Office Action 3/9/00* at pg. 13. As Applicant did not surrender the subject matter during prosecution and for at least the reasons stated in response to Examiner's Section 112 rejection, Applicant respectfully requests withdrawal of Examiner's rejection. Simply stated, Applicants should be allowed to correct through reissue to claim that which is rightfully theirs.

### **CLAIM REJECTIONS UNDER 35 U.S.C. §§ 102 and 103**

Examiner rejects claims 27, 39, 41 and 66 under 35 U.S.C. 102(b) as anticipated or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gutierrez. *Office Action 3/9/00* at pg. 13. By amendment, Applicant has limited a contact hole to include an upper portion


width different from a lower portion width. For at least the reasons which supported allowance of the original patent, Applicant respectfully asserts that claims 27, 39, 41 and 66, as amended, are in condition for allowance

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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